

A study on snake diversity in Ghatal Subdivision and its adjoining area

Souvik Bisui¹, Madhumita Mondal², Ayan Samanta³, Ranajit Kumar Khalua^{4*}

¹ Guest lecturer, Department of Zoology, Narajole Raj College, West Bengal, India

² Assistant Professor, Department of Zoology, Ghatal Rabindra Satabarsiki Mahavidyalaya, Ghatal, Paschim Medinipur, West Bengal, India

³ Department of Zoology, Narajole Raj College, Narajole, Paschim Medinipur, West Bengal, India

⁴ Vice Principal & Associate Professor, Department of Zoology, Narajole Raj College, West Bengal, India

DOI: <https://doi.org/10.66856/ijer.2026.11.2.11203>

Abstract

Ghatal subdivision is an administrative subdivision of Paschim Medinipur district in West Bengal. The Ghatal subdivision area is about 953 sq km. It has 5 community development blocks including Ghatal, Chandrakona-I, Chandrakona-II, Daspur-I, Daspur-II and 5 municipalities including Ghatal, Chandrakona, Khirpai, Ramjibanpur, and Kharar. The region is mainly a riverine plain area and is influenced by rivers like the Shilabati and Rupnarayan. Ghatal is one of the most flood-prone regions of West Bengal. Flooding occurs almost every year, especially during the monsoon season (June-September). Especially in this time snake bite is a very common and fatal problem as the snakes lost their habitat during flood and often enter homes, roadside, and crop fields, increasing human-snake encounter. Snake diversity indicates a high species richness in Ghatal subdivision area. There are many types of venomous and non-venomous snakes seen in this region. Some common venomous snakes are Indian Cobra, Russell's viper, and Common Krait etc. Every year Russell's viper caused about 82%, cobra caused 11% and common krait caused 2% of venomous bites are occurred and the fatality rate is about 20%. Some of non-venomous including Rat Snake, Checkered Keelback, Bronzeback Tree snake etc. are also seen in these regions. These venomous and non-venomous snakes normally co-exist with human habitat and their surrounding area. They have different natures including habitat, habit, and body length and venom types. So, we can say that snakes are most diversified reptilian.

Keywords: Indian cobras, Russell's viper, common krait, rat snake, checkered keelback, bronzeback tree snake

Introduction

Snakes are limbless, elongated, carnivorous vertebrate animals belonging to the phylum chordata (Slobodian *et al.*, 2022) [18]. The snake belongs to class Reptilia and order squamata (Pyron *et al.*, 2013) [15]. Snakes are believed to have originated about 12.8 corer years ago during the late Jurassic to early Cretaceous period (Caldwell *et al.*, 2015) [1]. They are found everywhere on Earth except Antarctica. About 300 species of snakes are found in India. In West Bengal, the number of these species is about 100. They can be classified in different ways, but the most common and simple classification is based on whether they are venomous or non-venomous.

Materials and Methods

For the collection of data and images, the snakes were rescued from human habitations using various scientific snake rescue methods. In this process, some safe snake rescue equipment was used like snake rescue hooks, tongs, gumboots, gloves, etc. No snake was captured or disturbed from its natural habitat. The venomous snakes rescued from human settlements were handed over to the Ghatal Social Forestry Range Office, and later, forest department officials safely released them into deep forest areas.

Diversity of Snakes in Ghatal Subdivision

Five species of venomous snake and ten species of non-venomous snake are found in Ghatal subdivision area.

1. Venomous Snakes

Two species of Cobra, one species of viper and two species of krait are found in Ghatal subdivision area.

Naja naja (Spectacled Cobra)

Naja naja, commonly known as the spectacled cobra, is a species of cobra belongs to family elapidae. The species is native to the Indian subcontinent as well as Ghatal subdivision (Mukherjee, 2021) [10]. It is famous for its spectacle shaped mark on the back of its hood. When threatened, it expands its hood and the hood mark will be visible (Thakkar, 2024) [21]. In case of this cobra, sometimes the hood mark is absent. Generally, the body colour is brown, black, yellowish, or gray. Average length will be 1 to 1.5 meters (Young and Kardong, 2010) [24]. It is generally seen in fields, rat holes, open forests, and even near human settlements. They are active during both day and night (Taylor, 1978) [20]. Spectacled cobra possesses neurotoxic venom which affects the nervous system, causing paralysis and difficulty in breathing. They are oviparous and the female lays about 10 to 30 eggs from March to July month (Wadia and Wadia, 2005) [22]. The eggs are oval (elliptical) in shape, soft and leathery (not hard like bird eggs). The eggs often stick together in clusters. The main food of this snake is rats, mice, frogs etc. The spectacled cobra is one of India's "Big Four" venomous snakes responsible for most snakebite cases.

***Naja kaouthia* (Monocled Cobra)**

Naja kaouthia, commonly known as monocled cobra for its single circular hood mark. Due to genetic variation, sometime the monocle shaped hood mark looks like spectacle type. It is known as pseudo spectacle (Ratnarathorn, 2019) [16].

An interesting information about this snake is that the monocled cobra is also known as Indian spitting cobra as it can spit its highly neurotoxic venom while threatened. The length can reach up to 2 meters (Giri *et al.*, 2021) [6]. The body colour is brown, olive, or black. The most favourable habitat of this snake is wetlands. Monocled cobra likes to eat fishes, frogs, toads etc. They are also oviparous and the female lays about 08 to 18 eggs from January to March month. The eggs are oval (elliptical) in shape, soft and leathery (not hard like bird eggs). The eggs often stick together in clusters. They are mainly nocturnal in nature (Mattison, 2025) [9].

***Daboia russelii* (Russell's viper)**

Daboia russelii or russell's viper is a highly venomous species that is very common in Ghatal subdivision area. It belongs to the family viperidae and possess highly hemotoxic venom. Russell's viper is well known for its very dangerous and painful bite as the hemotoxic venom is so much deadly causes blood clotting failure, internal bleeding, swelling, tissue damage, kidney failure, etc. The body of this snake is thick, heavy with triangular head with prominent neck. Three rows of oval or chain like spot is present on the body. Body colour is brownish or yellowish with dark oval spots. It makes loud hissing sound when threatened and can strikes quickly. Russell's viper is commonly found in agricultural fields, grasslands, and even near human settlements. They are mostly nocturnal but can be active in day time. The population of this snake in Ghatal subdivision area is very high as it is ovoviviparous (gives birth to live young) and can produce 10 to 63 babies at a time. This snake has the second largest fangs in the world after the gaboon viper. It is one of India's "Big Four" venomous snakes responsible for most snakebite cases (Faisal *et al.*, 2021) [10].

***Bungarus caeruleus* (Common krait)**

Bungarus caeruleus or common krait is a highly venomous species that is responsible for many snakebite deaths in Ghatal subdivision area. It is also one of the "Big Four" snakes of India responsible for most bites. The most venomous snake in the continent of Asia is common krait as its only 1 ml venom is enough to kill a human. Common krait possess neurotoxic venom which affects the nervous system, causing paralysis and difficulty in breathing. The body of this snake is glossy black or bluish black with thin white crossbands while the bands may fade in adults. The size is usually 0.9 to 1.2 m and sometimes up to 1.8 m. Scales are very smooth and shiny. They are mainly nocturnal in nature and often enters houses in search of prey at night. They are well known as silent killer as the bite is

painless, so victims may not realize immediately. Lower abdominal pain, drooping eyelids, difficulty in speaking and breathing are some common symptoms that occurs by this snake venom in victims. Those are oviparous and the female lays near about 8 to 12 eggs from March to May month (Pandey *et al.*, 2020) [12].

***Bungarus fasciatus* (Banded krait)**

Banded krait is called so for its bright yellow and black cross bands all over the body. Body shape is triangular and length is usually 1 to 2.2 meters and can grow up to 2.7 meter which makes it the longest species of krait. Its venom is highly neurotoxic which is lethal to humans but there are no previous snake bite records caused by this snake in Ghatal subdivision area. They are mainly nocturnal and very shy in nature, generally avoids humans. It helps to control populations of other snakes, including venomous ones. The female lays around 4 to 14 eggs at month of April and the female guards the eggs until they will hatch (Chen *et al.*, 2021) [3].

2. Non Venomous Snakes

Ten species of non venomous snakes are found in Ghatal subdivision area.

***Fowlea piscator* (Checkered keelback)**

Checkered keelback is a common non venomous snake found in Ghatal subdivision area. They are from family colubridae. They are named so as the body colour is olive, brown, or gray with black checkered spots. They live near aquatic body like ponds, rivers, canals, rice fields. Checkered keelback is mainly diurnal. When threatened they flattens their body like a cobra. They like to eat fishes that's why it is called "Piscator"(fish-eater) (Sujeet Jamdar, 2025) [19].

***Ptyas mucosa* (Rat Snake)**

Ptyas mucosa or rat snake is a very common non venomous snake generally found near human settlements. They are looks like cobra in length but they have no hood like cobra. Rat snake mainly feeds on rats and mice that's why they are named so. The body colour is yellowish, brown, olive, or gray. They can move very fast than other snakes. Rat snake is very usefull in controlling rodent populations (Jadhav, 2021) [10].

***Amphiesma stolatum* (Buff striped keelback)**

Buff striped keelback is named so for its two buff or yellow longitudinal stripes running along the sides. Body colour is brown or olive and the length is usually 40 to 90 cm. The perfect habitat of this snake is grassland, gardens, agricultural fields and frequently seen in human settlements. They are non-venomous and generally feeds on small frogs and tadpoles (Wyneken, 2015) [23].

***Boiga trigonata* (Common cat snake)**

Common cat snake is a arboreal species that rarely seen in Ghatal subdivision. It belongs to family Colubridae. It is

rear-fanged, mildly venomous but the venom is not harmful to human. Body colour is light brown, gray, with dark irregular blotches. The eyes are large with vertical cat-like pupils that's why they are named so. They are nocturnal in nature and feeds on lizards, geckos, small birds and eggs. The venom used mainly to subdue small prey (Paul *et al.*, 2025) ^[13].

Enhydris sp. (Smooth-scaled water snake)

Enhydris sp. is a water snake that belongs to family homalopsidae. They live in mud and like to eat small fish, tadpoles and frogs. They prefer freshwater environments with muddy bottoms. The length is usually 40 to 80 cm. Body colour is dark brown, grey, or olive. Head is small and not distinct from body. The eyes are positioned higher that helps them in aquatic life. They are non-venomous and nocturnal in nature. Smooth-scaled water snake gives birth to live young means they are viviparous like vipers (Karns *et al.*, 2010) ^[24].

Dendrelaphis tristis (Bronze back tree snake)

Dendrelaphis tristis or bronze back tree snake is a non-venomous snake that are arboreal in nature. The length of this snake is 1 to 1.5 meters and the body is very slender and long. The eyes are large with round pupils. Their shiny bronze colour gives them the name “bronzeback”. They mainly feed on lizards, frogs, insects (Nagarajan *et al.*, 2024) ^[11].

Ahaetulla nasuta (Green vine snake)

Ahaetulla nasuta or green vine snake is a very beautiful mildly venomous species but not dangerous to humans. Body is extremely thin, vine like with bright green colour. They exactly look like a green twig. The head is with a sharp pointed snout. The eyes are large with horizontal pupils. Vine snakes are arboreal in nature and have excellent vision (Rodrigo *et al.*, 2025) ^[9].

Lycodon aulicus (Common wolf snake)

The common wolf snake is a non-venomous species. It is famous because it looks similar to the highly venomous common krait. But is is completely harmless. They are frequently seen near human settlements, especially at night. Body colour is dark brown with white or pale irregular bands. The main food of this snake is house geckos and lizards (Praseetha *et al.*, 2026) ^[14].

Indotyphlops braminus (Brahminy blind snake)

Indotyphlops braminus is one of the smallest snakes in the world. It looks like an earthworm, and many people mistake it for one. They belong to family typhlopidae. The habitat of this snake is garden soil, flower pots and leaf litter. They mainly prefer moist, loose soil. Length is about 6 to 17 cm and the body colour is dark brown, or black. Body is very thin and cylindrical and the head and tail look very similar. The eyes are very tiny, barely visible. They mainly eat ants, termites and their eggs. They are mainly fossorial in nature and non-venomous. They are completely harmless to humans and often cannot bite effectively due to tiny mouth. An interesting fact about this snake is that all individuals are female and the reproduction occurs by parthenogenesis process (Chan, 2023) ^[2].

Oligodon arnensis (Banded kukri snake)

Oligodon arnensis is a non-venomous and rare species in Ghatal subdivision. They are mainly nocturnal. The length is 30 to 60 cm and the body is slender with brown, reddish, or grey colour. Dark cross bands are present all over the body. They are very look similar to common krait but completely harmless to humans. When threatened they may coil and hide head and sometimes they can bite repeatedly (De *et al.*, 2018).

Table 1: Diversity of Snake Species Recorded in Ghatal Subdivision

Sl. No.	Scientific Name	Common Name	Family	Venom Status
1	<i>Naja naja</i>	Spectacled Cobra	Elapidae	Venomous
2	<i>Naja kaouthia</i>	Monocled Cobra	Elapidae	Venomous
3	<i>Daboia russelii</i>	Russell's Viper	Viperidae	Venomous
4	<i>Bungarus caeruleus</i>	Common Krait	Elapidae	Venomous
5	<i>Bungarus fasciatus</i>	Banded Krait	Elapidae	Venomous
6	<i>Fowlea piscator</i>	Checkered Keelback	Colubridae	Non-venomous
7	<i>Ptyas mucosa</i>	Rat Snake	Colubridae	Non-venomous
8	<i>Amphiesma stolatum</i>	Buff-striped Keelback	Colubridae	Non-venomous
9	<i>Boiga trigonata</i>	Common Cat Snake	Colubridae	Mildly Venomous
10	<i>Enhydris sp.</i>	Smooth-scaled Water Snake	Homalopsidae	Non-venomous
11	<i>Dendrelaphis tristis</i>	Bronzeback Tree Snake	Colubridae	Non-venomous
12	<i>Ahaetulla nasuta</i>	Green Vine Snake	Colubridae	Mildly Venomous
13	<i>Lycodon aulicus</i>	Common Wolf Snake	Colubridae	Non-venomous
14	<i>Indotyphlops braminus</i>	Brahminy Blind Snake	Typhlopidae	Non-venomous
15	<i>Oligodon arnensis</i>	Banded Kukri Snake	Colubridae	Non-venomous

Table 2: Habitat Preference and Activity Pattern of Recorded Snake Species

Species	Preferred Habitat	Activity Pattern
Spectacled Cobra	Fields, forests, settlements	Diurnal & Nocturnal
Monocled Cobra	Wetlands	Mostly Nocturnal
Russell's Viper	Agricultural fields, grasslands	Mostly Nocturnal

Common Krait	Human settlements	Nocturnal
Banded Krait	Forest edges, wetlands	Nocturnal
Checkered Keelback	Ponds, rivers, canals	Diurnal
Rat Snake	Human settlements, fields	Diurnal
Buff-striped Keelback	Gardens, grasslands	Diurnal
Common Cat Snake	Trees and shrubs	Nocturnal
Smooth-scaled Water Snake	Freshwater bodies	Nocturnal
Bronzeback Tree Snake	Trees	Diurnal
Green Vine Snake	Trees and bushes	Diurnal
Common Wolf Snake	Human settlements	Nocturnal
Brahminy Blind Snake	Soil, leaf litter	Fossorial
Banded Kukri Snake	Agricultural land	Nocturnal

Table 3: Summary of Snake Diversity in Ghatal Subdivision

Category	Number of Species	Percentage (%)
Venomous	5	33.33
Non-venomous / Mildly Venomous	10	66.67
Total Species Recorded	15	100

Discussion

Snakes are becoming threatened in Ghatal subdivision due to several human-related and environmental factors. The major causes include habitat loss from deforestation, urbanization, agriculture, mining, and infrastructure development, which destroy the forests, grasslands, and wetlands where snakes live. Many snakes are also killed because of fear, superstition, and lack of awareness about their ecological importance. Road mortality is another significant threat, as snakes are often run over while crossing roads. In addition, the excessive use of pesticides and other chemicals contaminates their habitats and decreases the availability of prey such as frogs and rodents. Climate change, including rising temperatures, altered rainfall patterns, droughts, and floods, disrupts snake behavior, breeding, and survival. Together, these factors have led to population declines in many snake species across Ghatal subdivision, making their conservation increasingly important. To protect snakes and prevent their decline in Ghatal subdivision, several conservation measures should be taken. Natural habitats such as forests, grasslands, and wetlands should be preserved and restored to provide safe living environments for snakes. Public awareness programs should educate people about the ecological importance of snakes and discourage the unnecessary killing of these animals out of fear or superstition. Strict enforcement of wildlife protection laws is needed to stop illegal killing. The use of harmful pesticides and chemicals should be reduced to maintain healthy ecosystems and prey populations. Additionally, research, monitoring, and community participation in conservation efforts can play a vital role in ensuring the long-term survival of snake species in Ghatal subdivision.

Conclusion

The present study documents the diversity of snake fauna in Ghatal Subdivision and its adjoining areas of Paschim

Medinipur, West Bengal. A total of 15 snake species belonging to different families were recorded, including 5 venomous species and 10 non-venomous or mildly venomous species. The results indicate that the region supports considerable snake diversity due to the presence of varied habitats such as agricultural fields, wetlands, grasslands, riverine ecosystems, and human settlements.

Among the venomous species, Russell's viper (*Daboia russelii*), spectacled cobra (*Naja naja*), monocled cobra (*Naja kaouthia*), common krait (*Bungarus caeruleus*), and banded krait (*Bungarus fasciatus*) were found to be of major ecological and medical importance. Russell's viper appears to be the most significant contributor to snakebite incidents in the study area, emphasizing the need for public awareness and improved medical preparedness. Non-venomous species such as rat snake (*Ptyas mucosa*) and checkered keelback (*Fowlea piscator*) play an important ecological role by controlling rodent and amphibian populations, thereby contributing to ecosystem stability.

The study also highlights the increasing threats faced by snake populations, including habitat destruction, urbanization, road mortality, indiscriminate killing, pesticide use, and climate-related disturbances such as annual flooding. These factors not only affect snake survival but also increase human-snake conflicts.

Conservation of snake diversity in Ghatal Subdivision requires habitat protection, public education programs, scientific rescue and relocation practices, reduction of harmful pesticide use, and active participation of local communities. Long-term monitoring and further ecological studies are recommended to assess population trends, habitat utilization, and the impact of environmental changes on snake diversity. Protecting snake populations is essential not only for biodiversity conservation but also for maintaining ecological balance in the region.

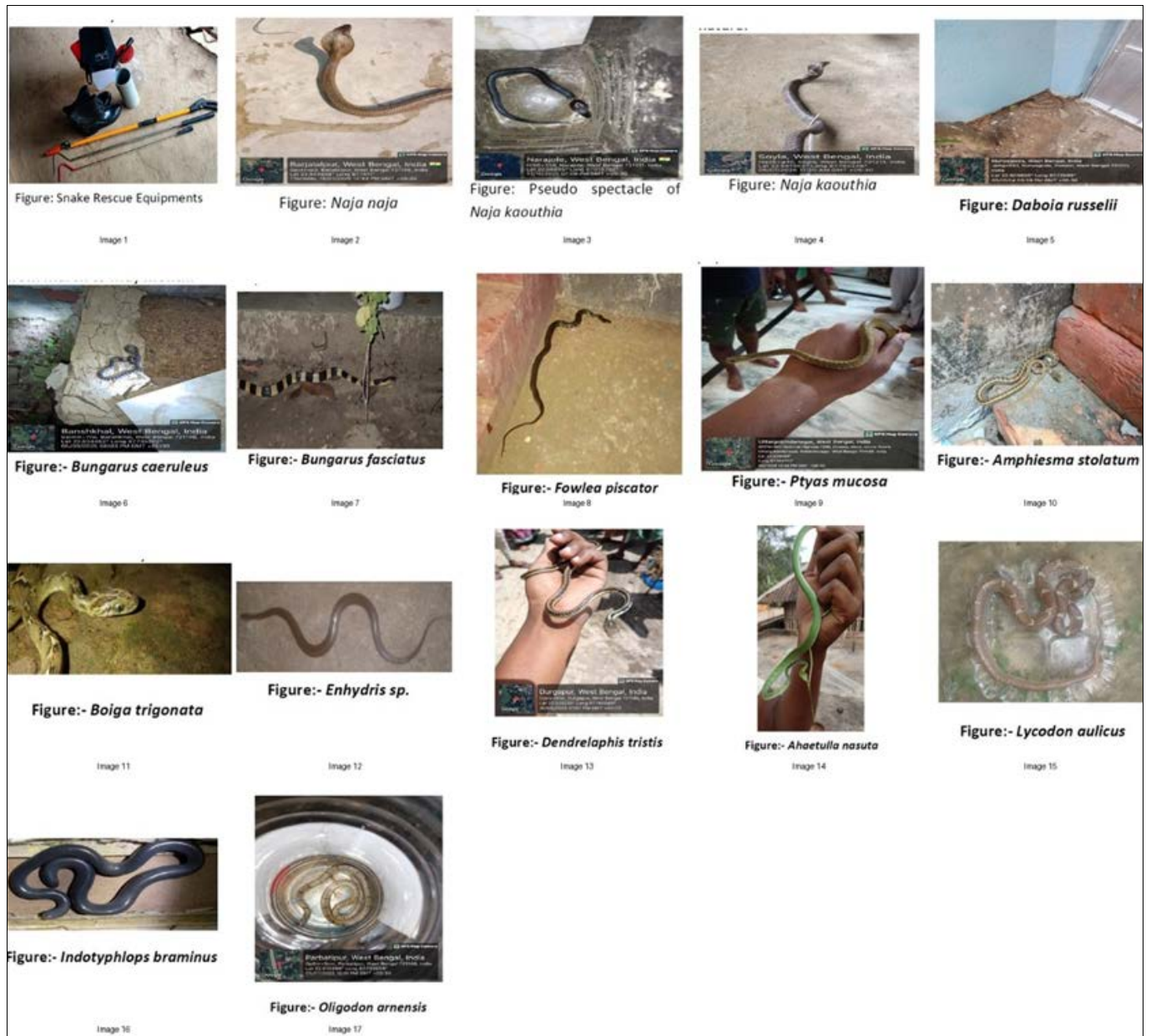


Fig 1: Representative snake species recorded from Ghatal Subdivision and adjoining areas, Paschim Medinipur, West Bengal.

References

1. Caldwell MW, Nydam RL, Palci A, Apesteguía S. The oldest known snakes from the Middle Jurassic-Lower Cretaceous provide insights on snake evolution. *Nature communications*,2015;6(1):5996.
2. Chan MH. Uncover the underground: distribution and population status of blind snakes and Bogadek's burrowing lizards, 2023.
3. Chen ZN, Shi SC, Vogel G, Ding L, Shi JS. Multiple lines of evidence reveal a new species of Krait (*Squamata, Elapidae, Bungarus*) from Southwestern China and Northern Myanmar. *ZooKeys*,2021:1025:35.
4. De P, Bhakat S, Sinha AK. Redescription of *Oligodon arnensis*, Shaw, 1802 (*Reptilia: Colubridae*) collected from Birbhum, West Bengal, India. *Indian Journal of Pharmaceutical and Biological Research*,2018;6(01):42-47.
5. Faisal T, Tan KY, Tan NH, Sim SM, Gnanathan CA, Tan CH. Proteomics, toxicity and antivenom neutralization of Sri Lankan and Indian Russell's viper (*Daboia russelii*) venoms. *Journal of Venomous Animals and Toxins including Tropical Diseases*,2021;27:e20200177.
6. Giri R, Baral R, Giri R, Shah KB, Tillack F. First records of the spitting behaviour of monocled cobra (*Naja kaouthia*) from Nepal. *Russ. J. Herpetol*,2021;28:122-124.
7. Jadhav A. Occurrence of *Porocephalus crotali* in lung tissue of an Indian rat snake (*Ptyas mucosa*): A case report. *Journal of entomology and zoology studies*, 2021.
8. Karns DR, Lukoschek V, Osterhage J, Murphy JC, Voris HK. Phylogeny and biogeography of the *Enhydris* clade (*Serpentes: Homalopsidae*). *Zootaxa*,2010;2452(1):18-30.
9. Mattison C. *The Lives of Snakes: A Natural History of the World's Snakes*. Princeton University Press, 2025.
10. Mukherjee AK. Indian Spectacled Cobra (*Naja naja*). In *The 'Big Four' Snakes of India: Venom Composition, Pharmacological Properties and Treatment of Envenomation*. Singapore: Springer Singapore, 2021, 69-94.

11. Nagarajan H, Shanmugasundaram S, Narayanasamy M, Basha SMS. Studies on Skeleton of Common Bronzeback Tree Snake (*Dendrelaphis tristis*). The Indian Journal of Veterinary Sciences and Biotechnology,2024;20(6):167.
12. Pandey DP, Bhattarai P, Piya RC. Food spectrum of common kraits (*Bungarus caeruleus*): an implication for snakebite prevention and snake conservation. Journal of Herpetology,2020;54(1):87-96.
13. Paul O, Satrusallya R, Boruah B, Dutta S, Somasundaram M, Das A. Amphibians and Reptiles of Mukandra Hills Tiger Reserve: A Photographic Guide. Wildlife Institute of India. Dehradun, 248001, 79, 2025.
14. Praseetha PK, Sakthivel G, Periasamy S, Vethamonickam SR, Balasubramanian R. Unmasking the silent nocturnal killer: a comprehensive review of common krait (*Bungarus caeruleus*) venom, neurotoxicity, and challenges in antivenom therapy in India. Toxin Reviews, 2026, 1-19.
15. Pyron RA, Burbrink FT, Wiens JJ. A phylogeny and revised classification of *Squamata*, including 4161 species of lizards and snakes. BMC evolutionary biology,2013;13(1):93.
16. Ratnarathorn N. Regional variation of the monocled cobra, *Naja kaouthia* Lesson, 1831 (*Squamata: Elapidae*) in Thailand: Development, Temperature Effects, Environment, and Phylogeny (Doctoral dissertation, UCL (University College London)), 2019.
17. Rodrigo P, Pathirana GP, Jayasekara D, Mahaulpatha D. Vertical predatory attack position of a Green Vinesnake, *Ahaetulla nasuta* (Lacépède, 1789), in the Kanneliya Rainforest, Sri Lanka. Herpetology Notes,2025;18:497-500.
18. Slobodian V, Rizzato PP, Sobral G. Vertebrates (*Chordata*). In Encyclopedia of animal cognition and behavior (pp. 7162-7189). Cham: Springer International Publishing, 2022.
19. Sujeet Jamdar S. Checklist of snakes (*Reptilia: Squamata*) in Tala Tahsil of Raigad, Maharashtra, India. International Research Journal of Science and Technology,2025;3(1):444-452.
20. Taylor KD. Range of movement and activity of common rats (*Rattus norvegicus*) on agricultural land. Journal of Applied Ecology, 1978, 663-677.
21. Thakkar A. Superheroes, Spectacles and Hoods: 'Dances of Identity' in Uncommon Spaces. Border Masculinities: Literary and Visual Representations, 2024, 171.
22. Wadia RS, Wadia NH. Environment and the nervous system. Neurological Practice. An Indian Perspective, 2005, 467-493.
23. Wyneken J. Anatomy of the leatherback turtle. The leatherback turtle: Biology and conservation, 2015, 32-48.
24. Young BA, Kardong KV. The functional morphology of hooding in cobras. Journal of Experimental Biology,2010;213(9):1521-1528.